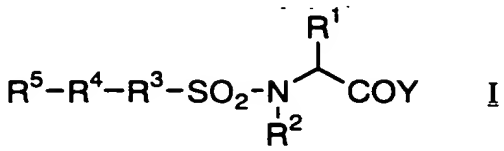
CLAIMS

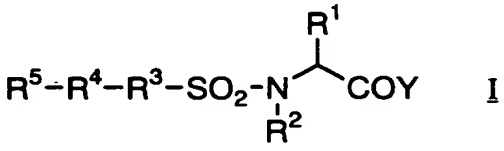
1. A composition for inhibiting metalloproteinase which contains a compound of the formula I:



I

wherein R^1 is optionally substituted lower alkyl, optionally substituted aryl, optionally substituted aralkyl, optionally substituted heteroaryl, or optionally substituted heteroarylalkyl; R^2 is hydrogen atom, optionally substituted lower alkyl, optionally substituted aryl, optionally substituted aralkyl, optionally substituted heteroaryl, or optionally substituted heteroarylalkyl; R^3 is a bond, optionally substituted arylene, or optionally substituted heteroarylene; R^4 is a bond, -(CH_2)m-, -CH=CH-, -C ≡ C-, -CO-, -CO-NH-, -N=N-, -N(R^A)-, -NH-CO-NH-, -NH-CO-, -O-, -S-, -SO_2NH-, -SO_2-NH-N=CH-, or tetrazol-diyl; R^5 is optionally substituted lower alkyl, optionally substituted C_3-C_8 cycloalkyl, optionally substituted aryl, optionally substituted heteroaryl, or an optionally substituted non-aromatic heterocyclic group; R^A is hydrogen atom or lower alkyl; Y is -NHOH or -OH; and m is 1 or 2; provided R^2 is hydrogen atom when Y is -NHOH, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

2. A composition for inhibiting metalloproteinase which contains a compound of the formula I:



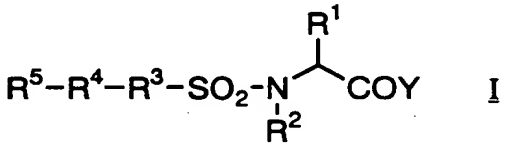
I

wherein R^1 is optionally substituted lower alkyl, optionally substituted aryl, optionally substituted aralkyl, optionally substituted heteroaryl, or optionally substituted heteroarylalkyl; R^2 is hydrogen atom, optionally substituted lower alkyl, optionally substituted aryl, optionally substituted aralkyl, optionally substituted heteroaryl, or optionally substituted heteroarylalkyl; R^3 is a bond, optionally substituted arylene, or

optionally substituted heteroarylene; R^4 is a bond, -(CH_2)m-, -CH=CH-, -C ≡ C-, -CO-, -CO-NH-, -N=N-, -N(R^A)-, -NH-CO-NH-, -NH-CO-, -O-, -S-, -SO_2NH-, -SO_2-NH-N=CH-, or tetrazol-diyl; R^5 is optionally substituted lower alkyl, optionally substituted C_3-C_8 cycloalkyl, optionally substituted aryl, optionally substituted heteroaryl, or an optionally substituted non-aromatic heterocyclic group; R^A is hydrogen atom or lower alkyl; Y is -NHOH or -OH; and m is 1 or 2; provided R^2 is hydrogen atom when Y is -NHOH, R^5 is optionally substituted aryl or optionally substituted heteroaryl when R^3 is optionally substituted arylene or optionally substituted heteroarylene and R^4 is -CO-NH- or -NH-CO-, R^5 is optionally substituted aryl or optionally substituted heteroaryl when R^3 is optionally substituted arylene or optionally substituted heteroarylene and R^4 is tetrazol-diyl, R^5 is lower alkyl, aryl substituted by lower alkyl or optionally substituted aryl, or heteroaryl substituted by lower alkyl or optionally substituted aryl when R^3 is optionally substituted arylene and R^4 is a bond, both of R^3 and R^4 are not a bond at the same time, and R^4 is not -O- when R^3 is optionally substituted arylene or optionally substituted heteroarylene, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

3. A composition for inhibiting metalloproteinase of claim 1 ~~or 2~~, which is a composition for inhibiting type-IV collagenase.

4. A compound of the formula I:

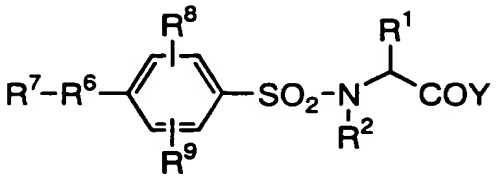


I

wherein R^1 is optionally substituted lower alkyl, optionally substituted aryl, optionally substituted aralkyl, optionally substituted heteroaryl, or optionally substituted heteroarylalkyl; R^2 is hydrogen atom, optionally substituted lower alkyl, optionally substituted aryl, optionally substituted aralkyl, optionally substituted heteroaryl, or optionally substituted heteroarylalkyl; R^3 is a bond, optionally substituted arylene, or optionally substituted heteroarylene; R^4 is a bond, -(CH_2)m-, -CH=CH-, -C ≡ C-, -CO-, -CO-NH-, -N=N-, -N(R^A)-, -NH-CO-NH-, -NH-CO-, -O-, -S-, -SO_2NH-, -SO_2-NH-N=CH-,

or tetrazol-diyl; R^5 is optionally substituted lower alkyl, optionally substituted C_3-C_8 cycloalkyl, optionally substituted aryl, optionally substituted heteroaryl, or an optionally substituted non-aromatic heterocyclic group; R^A is hydrogen atom or lower alkyl; Y is -NHOH or -OH; and m is 1 or 2; provided R^2 is hydrogen atom when Y is -NHOH, R^5 is optionally substituted aryl or optionally substituted heteroaryl when R^3 is optionally substituted arylene or optionally substituted heteroarylene and R^4 is -CO-NH- or -NH-CO- (when R^3 is phenylene and R^4 is -CO-NH-, R^1 is not methyl or phenyl and R^5 is not 2-chlorophenyl, 4-chlorophenyl, or 2,4-dichlorophenyl), R^5 is lower alkyl, optionally substituted aryl, or optionally substituted heteroaryl when R^3 is optionally substituted arylene or optionally substituted heteroarylene and R^4 is tetrazol-diyl, R^5 is lower alkyl, aryl substituted with lower alkyl or optionally substituted aryl, or heteroaryl substituted with lower alkyl or optionally substituted aryl when R^3 is optionally substituted arylene and R^4 is a bond, both of R^3 and R^4 are not a bond at the same time, and R^4 is not -O- when R^3 is optionally substituted arylene or optionally substituted heteroarylene, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

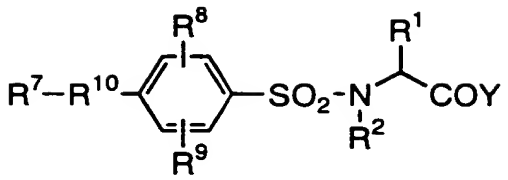
5. A compound of the formula II:



II

wherein R^6 is -CH=CH-, -C ≡ C-, -N=N-, -NH-CO-NH-, -S-, -SO_2NH-, or -SO_2-NH-N=CH-; R^7 is optionally substituted aryl or optionally substituted heteroaryl; R^8 and R^9 are each independently hydrogen atom, lower alkoxy, or nitro; R^1, R^2, and Y are as defined above, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

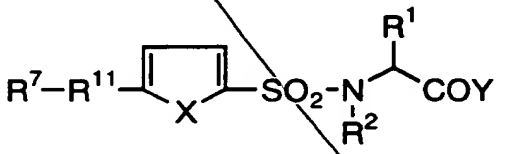
6. A compound of the formula III:



III

wherein R^{10} is -(CH_2)m-, -CO-, -CO-NH-, -N(R^A)-, -NHCO-, or tetrazol-diyl; m is 1 or 2; R^1, R^2, R^7, R^8, R^9, R^A, and Y are as defined above, provided R^1 is not methyl or phenyl and R^7 is not 2-chlorophenyl, 4-chlorophenyl, or 2,4-dichlorophenyl when R^{10} is -NH-CO-, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

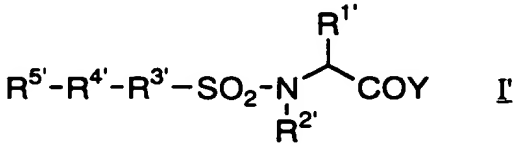
7. A compound of the formula IV:



IV

wherein R^{11} is a bond, -CH=CH-, or -C ≡ C-; X is oxygen atom or sulfur atom; R^1, R^2, R^7, and Y are as defined above, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

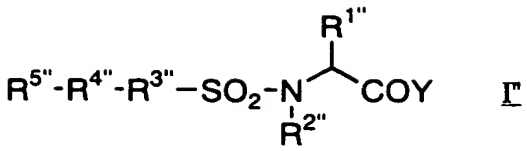
8. A compound of the formula I':



I'

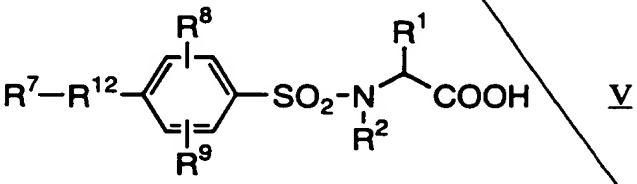
wherein $R^{1'}$ is benzyl, (indol-3-yl)methyl, (1-methylindol-3-yl)methyl, (5-methylindol-3-yl)methyl, (5-fluoroindole-3-yl)methyl, (1-acetylindol-3-yl)methyl, (1-methylsulfonylindol-3-yl)methyl, (1-alkoxycarbonyl-3-yl)methyl such as ethoxycarbonylmethyl, or i-propyl; $R^{2'}$ is hydrogen atom, methyl, 4-aminobutyl, or benzyl; $R^{3'}$ is 1,4-phenylene; $R^{4'}$ is -O-; $R^{5'}$ is phenyl or 4-hydroxyphenyl; and Y is as defined above, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

9. A compound of the formula I'':



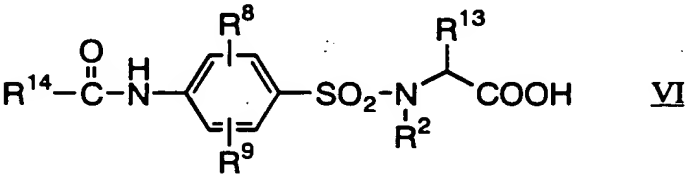
wherein $R^{1"}$ is 4-thiazolylmethyl, (indol-3-yl)methyl, (5-methoxyindol-3-yl)methyl, 1-naphthylmethyl, 2-naphthylmethyl, 4-biphenylylmethyl, 2,2,2-trifluoroethyl, 2-phenylethyl, benzyl, i-propyl, 4-nitrobenzyl, 4-fluorobenzyl, cyclohexylmethyl, (1-methylindol-3-yl)methyl, (5-methylindol-3-yl)methyl, (5-fluoroindol-3-yl)methyl, (pyridin-4-yl)methyl, (benzothiazol-2-yl)methyl, (phenyl)(hydroxy)methyl, phenyl, carboxymethyl, 2-carboxyethyl, hydroxymethyl, phenylmethoxymethyl, 4-carboxybenzyl, (benzimidazol-2-yl)methyl, (1-methylsulfonylindol-3-yl)methyl, or (1-ethoxycarbonylindol-3-yl)methyl; $R^{2"}$ is hydrogen atom; $R^{3"}$ is 1,4-phenylene; $R^{4"}$ is a bond; $R^{5"}$ is phenyl, 3-methoxyphenyl, 4-methoxyphenyl, 4-methylphenyl, 4-tert-butylphenyl, 4-trifluoromethylphenyl, 4-fluorophenyl, 4-methylthiophenyl, 4-biphenylyl, 2-thienyl, benzoxazol-2-yl, benzothiazol-2-yl, or tetrazol-2-yl; and Y is as defined above, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

10. A compound of the formula V:



wherein R^{12} is -CH=CH- or -C ≡ C-; R^1, R^2, R^7, R^8, and R^9 are as defined above, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

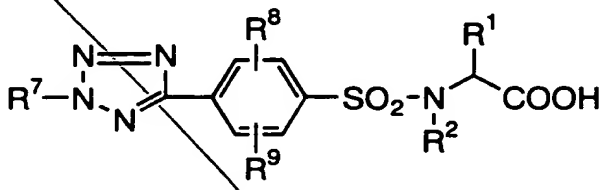
11. A compound of the formula VI:



wherein R^2, R^8, and R^9 are as defined above, R^{13} is optionally substituted lower alkyl,

optionally substituted aryl, optionally substituted aralkyl, optionally substituted heteroaryl, or optionally substituted heteroarylalkyl; and R^{14} is optionally substituted aryl or optionally substituted heteroaryl; provided R^{13} is not methyl or phenyl and R^{14} is not 2-chlorophenyl, 4-chlorophenyl, or 2,4-dichlorophenyl, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

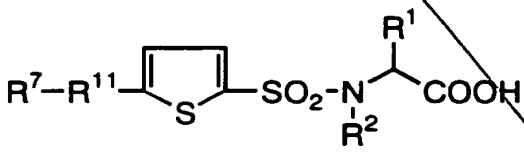
12. A compound of the formula VII:



VII

wherein R^1, R^2, R^7, R^8, and R^9 are as defined above, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

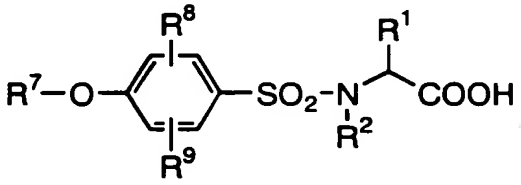
13. A compound of the formula VIII:



VIII

wherein R^1, R^2, R^7, and R^{11} are as defined above, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

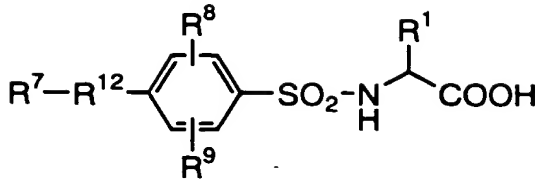
14. A compound of the formula IX:



IX

wherein R^1, R^2, R^7, R^8, and R^9 are as defined above, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

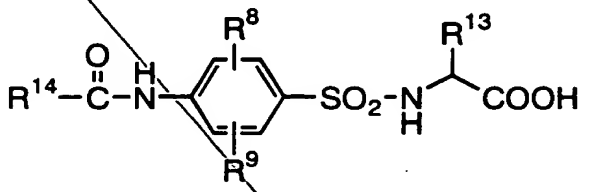
15. A compound of the formula X:



X

wherein R^{12} is -CH=CH- or -C ≡ C-; R^1, R^7, R^8, and R^9 are as defined above, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

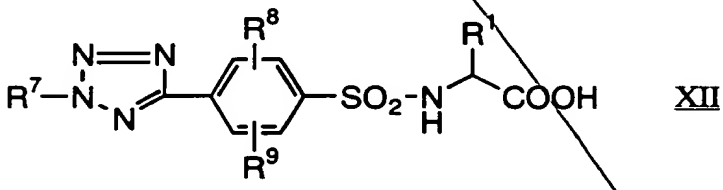
16. A compound of the formula XI:



XI

wherein R^1, R^8, R^9, R^{13}, and R^{14} are as defined above, provided R^{13} is not methyl or phenyl and R^{14} is not 2-chlorophenyl, 4-chlorophenyl, or 2,4-dichlorophenyl, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

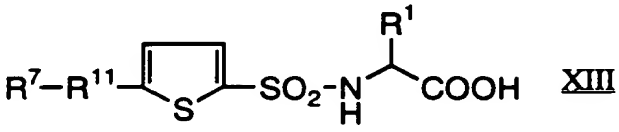
17. A compound of the formula XII:



XII

wherein R^1, R^7, R^8, and R^9 are as defined above, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

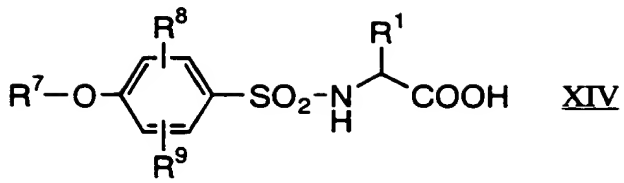
18. A compound of the formula XIII:



XIII

wherein R^1, R^7, and R^{11} are as defined above, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

19. A compound of the formula XIV:



XIV

wherein R^1, R^7, R^8, and R^9 are as defined above, its optically active substance, their pharmaceutically acceptable salt, or hydrate thereof.

20. The compound of ~~any one of claims 4 to 19~~ claim 4, wherein R^1, $R^{1'}$, $R^{1''}$, and R^{13} are i-propyl, benzyl, or (indole-3-yl)methyl.

21. The compound of ~~any one of claims 4 to 7 and 10 to 19~~ claim 4, wherein R^5, R^7, and R^{14} are phenyl optionally substituted with one or more substituents selected from the group consisting of alkoxy, alkylthio, and alkyl.

22. The compound of ~~any one of claims 4 to 19~~ claim 4, wherein a configuration of asymmetric carbon atoms bonding with R^1, $R^{1'}$, $R^{1''}$, and R^{13} is R configuration.

23. A pharmaceutical composition containing a compound of ~~any one of claims 4 to 19~~ claim 4.

24. A composition for inhibiting metalloproteinase containing a compound of ~~any one of claims 4 to 19~~ claim 4.

25. A composition for inhibiting type IV collagenase containing a compound of ~~any one of claims 4 to 19~~ claim 4.